SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583
DEPARTMENT OF ELECTRONICS & COMMUNICATON ENGINEERING

Subject with Code :STLD (19EC0401) **Course & Branch**: B.Tech - ECE

Year & Sem: I B.Tech & II Sem **Regulation:** R19

UNIT –I

Binary Systems, Boolean Algebra And Logic Gates

1. Convert the given decimal number 234 to binary, quaternary, octal, hexadecimal and BCD equivalent. **12M**

2. Convert the following to Decimal and then to Octal **12M**

i) 1234_{16} ii) $12EF_{16}$ iii) 10110011_2 iv) 352_6 v) 999_{16}

3. How are negative numbers represented? Represent signed numbers from +7 to -8 using different ways of representation. **12M**

4. a) Obtain the truth table for the Boolean function, F = (A+B) (B+C) and express the function as sum of minterms and product of maxterms. **6M**

b) Simplify the following Boolean functions to minimum number of literals **6M**

i) XYZ + X'Y + XYZ'. ii) XZ + X'YZ.

5. a) Simplify the following Boolean expressions to minimum no. of literals. **6M**

i) ABC+A'B+ABC' ii) (BC'+A'D)(AB'+CD')

b) Perform the following **6M**

i) Subtraction by using 10's complement for the given 3456 - 245.

ii) Subtraction by using 2's complement for the given 111001-1010.

6. a) With an example, explain in detail about the different types of binary codes. **8M**

b) Convert the following to Decimal and then to Hexadecimal. **4M**

i) $(1234)_8$ ii) $(11001111)_2$

7. a) Obtain the Dual of the following Boolean expressions. **8M**

i) AB+A(B+C)+B'(B+D) ii) A+B+A'B'C

iii) A'B+A'BC'+A'BCD+A'BC'D'E iv) ABEF+ABE'F'+A'B'EF

b) Simplify the expression XY+X'Z+YZ in to minimum literals. **2M**

c) Convert the A+BC into canonical form. **2M**

8. a) Determine the canonical product-of-sums representation of the following functions

i) f(A,B,C) =C (A'+B)(A+B') ii) f(A,B,C) =A(A'+B')(A'+C') **6M**

b) Perform the following using BCD arithmetic **6M**

i) $(79)_{10} + (177)_{10}$ ii) $(481)_{10} + (178)_{10}$

9.a) Discuss about the laws of Boolean algebra. **9M**

b) Why NAND and NOR gate is called as universal gate **3M**

10. a) State De Morgan's theorem and Duality. List Boolean laws and their Duals. **8M**

b) Give the truth table of logic gates. **4M**

11.a) Brief about the Digital Logic Gates **8M**

b) Discuss about Integrated circuits. **4M**

UNIT –II

Gate Level Minimization

1 . Simplify the following expression using the K-map F(A,B,C,D) = Σ(1,2,3,4,5,7,9,11,12,13,14) and implement using basic gates **12M**

2. a) Minimize the following Boolean function using K-Map **6M**
F(A, B, C, D)= Σm(0, 2, 4, 6, 8, 10, 12, 14).

b) Realize it using NAND Gates. **6M**

3. Simplify the following Boolean function using K map: F(A, B, C, D)=Σ(2, 4, 6, 10, 12); d(A, B, C, D)=Σ(0, 8, 9, 13) and realize it using basic gates **12M**

4. a) Simplify the following expression using the K-map for the 3-variable.
Y = AB'C+A'BC+A'B'C+A'B'C'+AB'C' **6M**

b) Simplify the Boolean function F(A,B,C,D)=∑(1,3,7,11,15)+d(0,2,5) **6M**

5. Simplify the expression using K-map for the following Boolean function and implement using two-level logic minimization F (A, B, C, D, E) =∑ (0,1,4,5,16,17,21,25,29) **12M**

6. a) Implement the following Boolean function using NOR gates Y=(AB'+A'B)(C+D'). **6M**

b) Implement the following function using only NAND gates G=(A + B).(C. D + E) **6M**

7.. Simplify the following Boolean expressions using K-map. **12M**
F(W,X,Y,Z)= XZ+W'XY'+WXY+W'YZ+WY'Z

8. Simplify the following Boolean function in POS form using K-map and implement using basic gates
F(A,B,C,D) = π_M(1,2,4,5,9,12,13,14) **12M**

9. Simplify the following Boolean function using Tabulation method **12M**
Y(A,B,C,D) = Σ(1,3,5,8,9,11,15)

10. Simplify the following Boolean function, f(W,X,Y,Z)=∑m(2,6,8,9,10,11,14,15) using Quine-McClukey tabular method **12M**

11. Simplifying the following expression using tabulation technique. **12M**
F=Σm(0,1,2,8,9,15,17,21,24,25,27,31)

UNIT –III

Combinational Logic Circuits

1.	With an example, illustrate the analysis procedure of combinational circuits.	**12M**
2.a)	Brief about the Step by step methods to design a Combinational Circuits.	**6M**
b)	Design & implement half Adder with truth table.	**6M**
3. a)	Design & implement Full Adder with truth table.	**6M**
b)	Design & implement Full Subtractor with truth table.	**6M**
4. a)	Design & implement the 4 bit binary Adder.	**6M**
b)	Design & implement half Subtractor with truth table.	**6M**
5.a)	Design & implement a 4-bit Binary-to-Gray code converter.	**6M**
b)	Design a 4 bit binary-to-BCD code converter	**6M**
6. a) a)	Implement the following Boolean function using 8:1 multiplexer. F(A,B,C,D) = A'BD'+ACD+B'CD+A'C'D.	**6M**
b)	What is multiplexer? Construct 4*1 multiplexer with logic gates and truth table	**6M**
7.	Explain Carry Look Ahead Adder circuit with the help of logic diagram.	**12M**
8. a)	Construct a BCD Adder-circuit.	**5M**
b)	Discuss in detail about serial adder with diagram	**7M**
9.	Implement 4-bit Magnitude Comparator and write down its design procedure.	**12M**
10. a)	Design & implement Full Adder using Decoder.	**5M**
b)	Implement a 2-bit Magnitude comparator .	**7M**
11. a)	What is encoder? Design octal to binary encoder.	**7M**
b)	Design a 1:4 Demultiplexer and mention the applications of a DEMUX.	**5M**

QUESTION BANK | 2019

UNIT –IV

Sequential Logic Circuits

1. a) Design D Flip Flop by using SR Flip Flop and draw the timing diagram. **6M**
   b) Write the differences between combinational and sequential circuits. **6M**
2. a) Draw the logic symbol, characteristics table and derive characteristics equation of JK flip flop. **6M**
   b) Design T Flip Flop by using JK Flip Flop and draw the timing diagram. **6M**
3. a). With logic diagram and timing diagram discuss about SR Flip Flop. **12M**
4. a) Convert S-R flip flop into JK-flip flop. Draw and explain the logic diagram. **6M**
   b) Draw the circuit of JK flip flop using NAND gates and explain its operation **6M**
5. Explain about state table, state diagram and state assignment techniques with an example. **12M**
6. Design and implement 3-bit ripple counter using J-K flip flop. Draw the timing diagram. **12M**
7. With a neat sketch explain MOD 6 Johnson counter using D FF. **IES 2015** **12M**
8. Explain about different types of shift registers. Briefly describe its operation. **12M**
9. What are the different types of counters .Explain briefly. 12M
10. a) Write the difference between Latch and Flip flop **2M**
    b) List asynchronous inputs of a sequential device **2M**
    c) Draw the block diagram of sequential circuit using combinational circuit and memory unit. **2M**
    d) Draw the logic circuit of flip-flop and truth table using NOR gates. **2M**
    e) Give the comparison between combinational circuits and sequential circuits. **2M**
    f) What is the advantage of choosing D flip flop in sequential circuits **2M**

UNIT –V

Finite State Machines and Programmable Memories

1. Explain different types of memory devices. **12M**
2. Realize F = Σm(0,2,3,7,9,11,15,16) using ROM **12M**
3. Implement the following Boolean function using PLA **12M**
   (i)F(w,x,y,z) = Σm(0,1,3,5,9,13) (ii)F(w,x,y,z)) = Σm(0,2,4,5,7,9,11,15)
4. Implement the following Boolean function usingPAL. **12M**
   (i)A(w,x,y,z) = Σm(0,2,6,7,8,9,12,13) (ii)B(w,x,y,z)) = Σm(0,2,6,7,8,9,12,13,14)
   (iii)C(w,x,y,z) = Σm(1,3,4,6,10,12,13) (iv)D(w,x,y,z)) = Σm(1,3,4,6,9,12,14)
5. Explain in detail about Content Addressable memory structure and its function. **12M**
6. Implement the following Boolean function usingPLA **12M**
   (i)F1= Σm(0,1,2,3,8,10,12,14) (ii)F2 = Σm(0,1,2,3,4,6,8,10,12,14).
7. a) How does the PLDs differ from fixed logic devices? What are the primary advantages of using PLDs. **6M**
   b) Implement PLA circuit for the following functions F1(A,B,C)= Σm(3,5,6,7), F2(A,B,C)= Σm(0,2,4,7). **6M**
8. Differentiate among ROM, PROM, DROM, EPROM, EEPROM, RAM. **12M**
9. Give the logic implementation of a 32x4 bit ROM using a decoder of a suitable figure. **12M**
10. Draw the diagram of melay type FSM for serial adder.. **12M**
11. a) Give the classification of semiconductor memories. **2M**
    b) Draw a simple memory with necessary signals. **2M**
    c) What are the advantages of flash memory? **2M**
    d) What is the concept of CCD? **2M**
    e) Compare PAL, PLA & ROM **2M**
    f) Distinguish between melay & moore machines. **2M**